THE AMERICAN

GAS-LIGHT JOURNAL AND CHEMICAL REPERTORY

Publishing Office, No. 42 Pine Street.

Devoted to the Interests of Illumination, Heating, Ventilation and Sanitary Improvement, Domestic Economy, and General Science.

VOLUME XIV.—No. 10.
WHOLE No. 243.

NEW YORK, TUESDAY, MAY 16, 1871.

$3 PER ANNUM
IN ADVANCE.

Kennedy's Patent Triangular Trussed Wrought Iron Tower for Gasholder Suspension Frame.

MANUFACTURED BY THE ATLANTIC DOCK IRON WORKS, SOUTH BROOKLYN.

Most of our readers are aware of the many different styles of columns used for the suspension frames of gasholders. The majority are cast round, having the guide bar bolted to them, with intervening brackets, which are of cast iron; the counterbalance weights, in the case of a telescopic holder, working inside of the column. Some are made of cast iron plates, cast in open work, and in sections, secured together by corner pieces bolted through the edge of the plates, and generally having two guides to each tower.

Another plan is to have cast iron fluted columns, resting on entablatures, and duplicated, until the desired height is obtained; in some cases having two columns, in others three columns to each section; the guides being secured to the edge of each entablature—the upper one carrying the chain wheels and carriage, over which the chain attached to lower section of holder and counterbalance weight works.

Recently, round columns have been made of wrought plate iron, bent to the circle, and connected together by countersunk rivets, with a connecting plate inside at each joint.

Each of these plans have their advocates, but all are defective in some way or other. The round cast iron column is perhaps strong enough, but it is not sightly, and the counterbalance weights are out of view; the same objection applies to the round wrought iron columns, while the cast iron open work tower permits a view of the counterbalance weights and chains, and in case of accident to either, permits of ready access to fix it. The plan of tower lacks the element of strength spoken of and all are unnecessarily expensive.

The tower or column which we desire to call our readers attention to, is one of recent date. It consists of a triangular cast iron base and capital; the shaft is composed of three bars of T iron 3in. x 3½in. x ½in., one at each corner of the triangle; the bar next the gasholder is let into the base, and bolted. The first cross bar is composed of angle iron 3in. x 5in. x ½, riveted at each end to the T iron, and bolted to the base; the same arrangement secures the capital. The intervening bars are composed of iron 3½in. x ½in., bent in a press to the exact angle, and riveted with hot rivets ¾in.; the rivets passing through wrought iron rosettes, as seen on the drawing. The chain wheels and carriage are placed inside the capital, which has a hole cored out in front for the chain to pass through; thence over the wheels, and dropping exactly in the centre of the tower, which gives ample space for the counterbalance weight, keeps them in sight, and gives ready access to adjust it when necessary. The head of the T iron bar on the corner forms the guide for the press wheel to work upon, thus dispensing with guides bolted on; is stronger, and permits the flanges of the wheels to be three inches deep.

For strength, durability, and cheapness, this plan has no rival, whilst it corresponds so entirely with the

girders connecting them, that they harmonize with each other, and make a very handsome structure.

The usual plan is to rest the girders *upon the top* of the column. In this frame it will be observed that the girder *passes through* the column, resting upon heavy angle irons, to which it is bolted, as well as to the capital, while the girders are all securely butt-plated together at their ends; thus forming a *ring* of girders that pass *through* the column, not merely resting upon the top. The capital being above the girders gives this frame a very finished appearance.

Letters patent have been applied for, and we expect to see many of these frames erected; and we regard it as a decided advance in strength, beauty, and economy of construction.

We undertand that Mr. KENNEDY is building a number of these suspension frames, and that they are highly approved of by all the gas fraternity who have seen his plans.

The Atlantic Dock Iron Works has been established for the manufacture of gas works machinery exclusively, and all work executed there is of the most modern construction, and executed under the direction of Mr. JOHN P. KENNEDY of the firm of HOY, KENNEDY & Co., who has a world wide reputation as a Gas Works Engineer and constructor, having erected and started many of the largest gas works in the country. The last gas works finished by him was the Citizens of Newark, New Jersey, a visit to which will well repay our readers interested in gas works. He is now erecting the works of the New York Mutual Gaslight Company at 11th street, East River, and although engaged in large works he is equally competent in the construction of smaller works; whether in construction or management he is thoroughly posted, and can furnish all the modern *sensible* improvements in the manufacture of gas.

Protecting Water-Pipes.

It is self-evident that as far as practicable all iron water-conduits should be protected from oxydation, not only to provide against the premature giving way of the metal, but to secure the scarcely less important *desiderata* of avoiding any undue roughening of the internal surface or the diminution of the bore by the accumulation of rust. The prevention of those evils is neither easy nor common, and the detriment occasioned by them can in many cases hardly be computed. We have heard it stated by those apparently well qualified to judge, that the want of "head" experienced with the water supply of New York City is, in a great measure, due to increased friction of the water flowing in contact with the corroded surfaces. Of means more or less capable of preventing the results just referred to, that most approved has comprised the simple coating of the surfaces with a tenacious varnish. That used on the pipes of the Cochituate Water-works in Boston withstood a ten years' test, and at the end of that time the pipes "were found to be almost free from rust or ochreous deposits." It was composed of coal-tar, distilled until the naphtha was wholly eliminated, and the tar or pitch brought down to the consistency of wax.

The tar reduced to this condition was heated to three hundred degrees, a temperature at which it was kept during the dipping operation, and about eight per cent. of linseed oil added to it. The pipes of cast-iron were heated to a degree determined by the judgment of the engineer in charge, and immersed in the prepared tar for from thirty to forty-five minutes, at the expiration of which they were placed in such position to drip that the remaining layer or coating of the material should be of uniform thickness. This method of protecting the pipes, now exclusively adopted in the water-works of most of our cities, is undoubtedly much better than nothing, and its advantages, like those accruing in California from the coating of wrought iron pipe with boiled asphaltum, far in excess of its cost; but, despite the freedom from oxydation claimed for the Cochituate pipes, it is quite possible that better and more permanent results can be gained by other and dissimilar means, especially those which would furnish the interior of the pipes with a mineral covering of appreciable thickness, and of a character not liable to any change from the action of the water.—*Am. Artisan.*

ONE OF THE wealthiest bankers of Chicago is charged with stealing the gas belonging to another man, by tapping his pipe on the wrong side of the meter.

Chemical Repertory,

No. 53.—May 16, 1871.

EDITOR—HENRY WURTZ.

[ORIGINAL COMMUNICATION.]

A REPORT ON PETROLEUM-NAPHTHA GAS, TO THE PRESIDENT AND BOARD OF DIRECTORS OF THE FORT WAYNE GAS-LIGHT COMPANY.

By HENRY H. EDGERTON, Superintendent.

[Continued from page 131.]

In a subsequent communication (without date) he gives some further tabulations:

CONSTITUENTS OF FAPHTHA-GAS REDUCED TO 100 VOLS.

MEMPHIS GAS.

Hydrocarbon illuminating gases	25.42
Marsh gas	34.16
Methyle	3.29
Nitrogen	32.24
Oxygen	4.89
	100.00

FORT WAYNE GAS.

	1st Analysis.		2d Analysis.	
Elayle (olefiant gas) $C_4 H_4$	37.54	55.81	38.28	55.81
Diettryle (butylene) $C_8 H_8$	18.27		17.53	
Marsh gas $C_2 H_4$ ... 2 vol. 4 vol.	13.98	44.19	13.98	44.19
Methyle ($C_2 H_3$ $C_4 H_5$)	30.21		30r21	
	100.00		100.00	

HYDROCARBONS CONDENSABLE BY CONCENTRATED SULPHURIC ACID.

In analysis of Memphis Naphtha Gas.

Gas employed 41.47 of which 7.143 is condensable by anhydrous sulp. acid.

Less nitrogen 13.37 of which 20.957 non-condensable.

Combustible gas 28.10

According to previous analysis; due non-condensable gases.

	Due Condensable.	Vol. Condensable.	Due Condensable.	Per vol.
Carb. acid	22.80	7.143	19.40	2.716
Oxygen used	52.136		21.50	3.010
Contraction	50.293		7.21	1.009

IN FORT WAYNE NAPHTHA-GAS.

Gas employed 6.819 of which 55.81 per cent. condensable, vol. 3.806.

	Non-condensable.	Per vol.	Due condensable.	Per vol.	Total.
Carbonic acid...	5.075	1.683	10.103	3.654	15.176
Oxygen used....	9.081	3.013	15.004	4.109	24.085
Contraction....	7.023	2.339	9.139	2.398	16.162

SECOND TRIAL.

Gas employed 7.600 of which

	Non-condensable.	Per vol.	Condensable.	Per vol.	Total.
Carbonic acid...	5.209	1.683	10.260	2.026	15.469
Oxygen used..	9.321	3.013	16.204	4.147	25.525
Contraction....	7.210	2.339	9.584	2.401	16.501

These three trials agree in the main that one volume of condensable gas, formed on explosion $2\frac{1}{2}$ volume of carbonic acid, and the illuminating power, compared with olefiant gas, should be one third greater, or as 1 to $1\frac{1}{3}$, according to Mr. Lewis Thompson's rule.

The specific gravity of the hydrocarbons, found by an indirect method, was 1.271. The candle power of the Fort Wayne gas would be, therefore, according to the chemical standard, 74.41 candles, or five to six times that of ordinary coal gas. The actual candle power by photometric test is much higher.

The analyses were all made (with exception of one) with Prof. FRANKLAND'S apparatus. Owing to a disproportion of parts (the laboratory tube being exceedingly small, holding only one third the contents of the measurer) but a very small quantity of gas could be analyzed, about $\frac{1}{2}$ c. c. when nitrogen was present. To give an idea of the experimental error on so small a quantity, four analyses of air by electrolytic hydrogen were made, which gave oxygen 20.59; 21.023; 20.368 and 18.967 per cent. respectively.

Mr. EDGERTON'S correspondence with us on this subject, so far, has closed with the communication of the following tabular summary of all his analytical results:

Chemical Analyses of Petroleum—Naphtha Gas, February and March, 1871.
By Henry H. Edgerton, Superintendent of the Fort Wayne Gas-Light Company.

		V.	V. K O	V. Pyrogal.	V SO_3 HO	CO_2 Pr. Ct.	O Pr. Ct.	Hydrocarbon. Pr. Ct.	P R V	R V + Air	O Added	N Added	Aft. Explosion.	R V K O	R V Pyrogal.	R V + H	R V 2d Explosion.	R V R N	CO_2 Formed.	O Used.	C Contracted.	CO_2 For 1	O or 100	C Vols.
1.	Memphis Gas	167.18	167.18	160.66	118.13	None	4.91	25.42	21.13	217.03	80.07	162.90	249.28	235.05	...	608.88	392.41	18.08	14.23	32.54	31.39			
2.	Same	41.47								540.40	106.82	395.15	488.90	441.70	408.51			28.10	42.20	73.63	57.50			
3.	Fort Wayne Naph. Gas,	193.15	193.15	192.36	107.81	None	0.41	55.81	13.49	210.51	41.29	155.71	180.34	158.56	156.26			12.94	21.79	39.00	30.16	1.68	3.01	2.33
4.	Same			Bunsen's	Method				19.46	351.16	69.53	262.17	308.41	277.31	263.76			17.86	31.10	55.97	42.75	1.74	3.18	2.39
5.	Same								19.59	252.93	335.77	184.43	230.76	205.76		347.41	293.89	16.21	25.00	48.75	39.14	1.63	3.18	2.55
7.	Same	7.96								144.76	28.80	108.61	128.17	112.70	108.95			7.00	15.47	25.04	16.59	2.21	3.29	2.37
7.	Same	7.21								184.02	37.06	139.75	167.87	152.15		188.57	151.16	6.819	15.18	24.68	16.15			
8.	Same								6.56	119.18	23.58	88.93	106.11	97.09		133.82	112.78	5.461	9.018	16.522	13.186	1.651	3.025	2.414

V = Volume.
R. V = Residual Volume.
R V—R N = Residual volume employed after deducting N found.

(1.) Memphis gas before going into "air mixer," supposed to be pure naphtha gas.

(2.) To find condensation of absorbable hydrocarbons.

(3.) Yielded from commercial benzine at rate of 80 cubic feet per gallon.

(4.) Analysis of residual gas from same after standing over water.

(5.) Another trial of residual gas after absorption of illuminating gases. the absorption made on a quantity contained in a glass holder. Sp. gr. of same by Bunsen's diffusion method .779.

(6.) Combustion of same gas (No. 5, 2nd series) before absorbing hydrocarbons to ascertain condensation, two trials.

(7.) Analysis of residual gas after passing No. 5 through Liebig bulbs containing bromine, through water, and caustic potash solution. Weight taken of each before and after

	Before.	After.	
Bromine	52.402	67.760	Weight of hydrocarbon absorbed 4.778 grms.
Water	95,580	106.220	Vol. of gas passed. Lost.
Potash	74,770	53.550	Volume of residual gas. 207.06 cub. inches.
	222.752	227.530	
		222.752	
		4.778	sp. gr. =.796

[ORIGINAL COMMUNICATION.]

New York Lyceum of Natural History.

AMMONIUM AMALGAM AND OTHER METALLIC FROTHS.

At the meeting of the Lyceum on May 8th., Prof. SEELY added some new facts and arguments to those presented a year agos, on the nature of ammonium amalgam and similar substances. The following is a synopsis of his remarks;

The views presented to the Lyceum in April 1870, are confirmed by further research, and, in the author's opinion, no tenable or rational objection has yet been brought against them. Two new cases of metallic froth are now to be added to that of the ammonium amalgam.

1s. When the liquid alloy of potassium and sodium (K75, Na25) is brought into an atmosphere of dry ammonia-gas, it absorbs many times its volume of the gas, and the mass is thereby puffed out in a metallic froth.

2d. If to the fusible alloy melting at 140°, (Cd 3, Bi 15 Pb 8 Sn 4) about one per cent. of sodium be added, by fusion and stirring, and the mass be then fused in a boiling solution of sal ammoniac, it becomes frothed.

The rationale of these cases seems evident; the alkali metals have the property of absorbing (*i. e.* condensing upon their molecules) ammonia gas, and are thereby increased in volume. The rationale, however, does not so plainly apply to the case of the ammonia mercuric froth. Sodium amalgam does not absorb ammonia gas directly; the mercury seems to neutralize the ordinary absorbing power of the sodium, and it seems necessary to suppose that in the ammonia mercuric froth, the absorbing property of the sodium is limited to ammonia in the nascent state. In LOEW's hydrogen mercuric froth, the absorbing substance is platinum and the gas hydrogen; the case seems not to require any detailed explanation. In Dr. GALLATIN's interesting experiment (bismuth ammonium!) the active agents are ammonium and sodium. The alloy of bismuth and sodium, exposed to air alone, without any use of sal ammoniac, as directed by him, presents the phenomena upon which he founded his theory of bismuth ammonium.

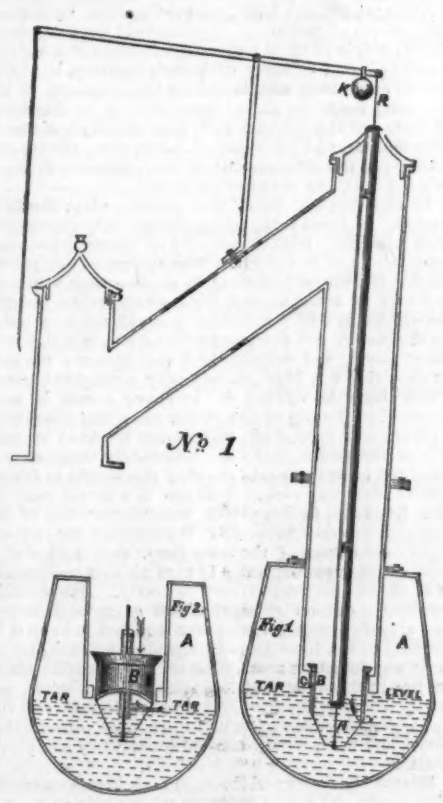
Trumbore's Dip-Pipe.

PATENTED APRIL 18, 1871.

The question of preventing the deposit of carbon in clay retorts, by removing the pressure entirely, will soon, if not already, be a settled question (which is the most simple, cheap arrangement and the least likely to get out of order). There is nothing about this invention to get out of order. I have had experience with ground joints and stuffing boxes, and found where the great trouble was. The stuffing box I found troublesome to keep tight. The ground joint, when the bench was out of use, would get fast, so that it could not be moved.

All this has been overcome by this simple arrangement.

The accompanying engraving represents the end view of the hydraulic main. Fig. 1 is sealed; fig 2 is unsealed; B is a hollow valve or dip-pipe fitting down on the shoulders, C, when sealed. The rod, R, that hoists and lowers the valve or dip, runs through the tube, E. This tube is screwed into the cap or bridge-pipe, and extends down into the tar, so as to dispense with the stuffing box. The weight, K, holds the valve



in its seat while charging the retort. The seat, C, can be put up at the first joint above the hydraulic main, and the dip-pipe made long enough to extend down into the tar, and the tar in the main lowered a half inch below the former dip-pipe, if necessary. For further information address, SAMUEL TRUMBORE, Easton, Pa.

[TESTIMONIALS.]

OFFICE EASTON GAS COMPANY
EASTON, May 1st., 1871

TRUMBORE'S PATENT DIP-PIPE.

This is to certify that Trumbore's Patent Dip-Pipe Apparatus has been in use at the Easton Gas Co. for the term of one year last past. It is attached to four benches of clay retorts, and has proved most satisfactory in its working, and a material saving to the company.

The average yield per pound of coal, during the last year, has been four cubic feet and six-tenths of gas, from Westmoreland coal.

This patent is also valuable in saving the retorts from damage and destruction, by carbon collecting inside; in all kinds of retorts—clay as well as iron. The testing with us has been with clay retorts.

Our works are supplied with an exhauster, and before using Trumbore's patent we had *an inch dip*. By this patent the pressure is *entirely removed* from the retorts, and consequently little or no carbon accumulates to their injury.

Another advantage of Trumbore's patent is, that benches of clay retorts running with it will last much longer.

At our works one bench has now been running thirteen months, and from present appearances, bids fair to last a year longer.

The following statement from the books exhibits the amount of coal consumed, and gas made during the last year.

M. H. JONES, President.

Statement taken from the books, at the office of the Easton Gas Company.

Coal used from May 1st, 1870, to May 1st, 1871..... 1419 net tons.
Gas made from same coal from May 1st, 1870, to May 1st, 1871..... 13,006,300 ft.

SAMUEL CUMMINGS,
Clerk Easton Gas Company.

I am foreman at the Easton gas works, and have charge of the retorts, to which Trumbore's dip-pipe is connected, and can say the statement of Mr. H. M. Jones is correct; and I think by taking in consideration the durability of retorts, and the increased yield of gas, it is a saving of 15 per cent to the company, and it is also less troublesome to keep the retorts up to their heat, by the carbon not accumulating in them.

VALENTINE WEAVER,
Foreman Easton Gas Company.

Natural Phenomenon in Cleveland—Discovery of Natural Gas.

Bret Harte, in his poem entitled "Dow's Flat," relates an incident where an unlucky miner, whose springs had dried up, and who failed in everything, struck gold while digging for water. The remarkable feature of it was that he obtained a colossal fortune through

—"sheer contrariness,
For 'twas water the derned cus was seeking,
And his luck made him certain to miss."

Luck of a similar nature, says the Cleveland *Leader*, caused some men who were digging a well to strike gas at a very short distance from the surface of the ground. This work was being done by Mr. Christin at the gas works at Lighthouse street hill. It was considered absolutely necessary to have more water, and for this purpose preparations were made for digging a well. Some two weeks were employed in bringing the machinery together, and the well was to be from twelve hundred to fifteen hundred feet deep. A pipe eight inches in diameter was forced down through the quicksand one hundred feet and nothing unusual observed. A few feet further down shale was encountered, and by the time the pipe had reached one hundred and four feet, yesterday noon the presence of gas was made known by a pressure that threw off a seventy pound weight that was upon the pipe and a good sized man who was leaning upon the weight.

This unexpected discovery created great surprise among the workmen, as the gas continued to swell out of the pipe in a large volume. A small gas pipe was at once attached, and the application of a match produced a bluish white light, having a great intensity of heat. The quality of the gas was untested and cannot be stated. It is without any perceptible odor.

This is the first instance that gas has been struck in this region at so short a distance from the surface of the earth. The discovery was the all engrossing theme of conversation yesterday afternoon among crowds of persons who visited the well. The subject has received but little attention from our citizens heretofore, and now the fact seems to be thrust upon them that we have gas in large quantities a few feet below the streets we tread upon, and can have fuel and perhaps light with but little trouble. The same strata of shale undoubtedly underlies the whole city, and can, all over the flats and priucipal manufacturing districts, be reached with but very little trouble. In Erie it is extensively used for fuel, and its application in our factories, instead of coal, will be an incalculable advantage. No discovery could be of greater moment to the interests of Cleveland.

OXYGEN GAS FROM BLEACHING POWDER.—Oxygen gas can be readily prepared by boiling bleaching powder and nitrate of cobalt in a flask. Make a clear solution of the powder in water, put it into any convenient flask provided with a perforated cork and tube, and pour in a few drops of a solution of nitrate or chloride of cobalt, and set it to boil. The oxygen of the hypochlorous acid is expelled, and chloride of calcium remains in the flask. It is difficult to explain the reaction, but it is generally supposed that the oxygen first goes to the cobalt, from which it is subsequently expelled by heat.—*Sci. American.*

Water Meters.

At a meeting of the Society of Arts, Adelphi, London, on Wednesday, February 22d, the following paper was read on Water Meters, by Mr. FREDERICK E. BODKIN:

The question of measuring water supply by meter has for a great many years been occupying the attention of engineers. Ever since 1824, a yearly increasing number of inventions bearing upon this important subject, and amounting at the present time to a total of 313, have been brought before the public, in which are included patents taken out in England and communications from foreign engineers which have been registered at the Patent Office; yet with all this great expenditure of ingenuity, it is generally allowed that there is no meter at present in really practical use which may be considered an accurate, or, in any way, a satisfactory machine.

Gas is a luxury hardly yet a necessity of life, whereas pure, wholesome water is, in the truest sense of the word; but gas is, viewed scientifically, a very similar material to deal with, and is supplied by volume through pipes, and is turned on and off as required, and measured and paid for by meter. Moreover, by comparison of equal volumes, we find that water is the more expensive commodity of the two, which is an additional argument favorable to the use of water meters under certain conditions, even though there were more difficulty and expense in obtaining them.

There are also other uses to which water meters may be applied, such as calculating the supply of water to steam boilers, for the purpose of ascertaining their evaporative power; also the expensiveness generally of water and steam power, a means of accurately judging which would enable the engineer, with far greater facility, to arrive at their comparative excellencies. The great difficulties which surround the designing of a good water meter must excuse the ill success, so far, of inventors in meeting this demand; these may be better judged of by a short statement of some of the offices required of such a machine.

Firstly, a water meter should register with accuracy, that is, within 1 per cent. of the truth; and this, it must be remembered, not under a uniform rate of flow of the fluid, but under every possible variation of pressure, from a head of only a few feet, up to 200 or 300, unless indeed it be intended to act as a low pressure meter, to some of which I shall call attention presently, and also under any ordinary variations of temperature.

Secondly, it ought to be of sufficient strength throughout to stand these high pressures, and even sudden alterations and blows under them, which form a still more trying ordeal.

Thirdly, it is very requisite it should be cheap, both in original cost and to maintain in repair subsequently. This latter consideration is very important, as under high pressures any bearing surfaces would be travelling at a great speed, and, even with the common impurities of water would be liable to wear away very fast.

Fourthly, simplicity, both in number and shaping of parts, chiefly because all water meters are liable to get soon clogged with a muddy deposit, and require cleaning, and any complexity renders this operation difficult and expensive; it also naturally infers great costliness in repairs when the machine gets out of order, a defect to which such would be particularly liable.

It also often happens that a meter may be left unused for a time, and the working parts become dry. This should not interfere with the accurate working of the machine on its again coming into use; it is also greatly to the advantage of any meter that it should be uninjured by the entrance of heated water or steam, when supplying steam boilers or other machinery, where such are used; that it should form a closed valve against the return of water already passed through it; also that the register and work should be out of reach of interference of people desirous to tamper with them; and a very important consideration, that there should be as little loss of head or decrease of flow as possible in the water during its passage through.

When we come to consider more carefully the leading features of all this vast mass of invention, we find that it is mainly directed to the measurement of water, under two different conditions, low and high pressure; low pressure where the water is delivered from the meter entirely free from momentum, and high pressure where the water arrives at, passes through, and leaves the meter at the same, or nearly the same velocity. Low pressure meters were in use some time before the introduction of the other description, are much more simple in design, and can be made to register with perfect accuracy; but they have now fallen into disuse, except in special cases.

They are entirely useless for supplying large quantities at any speed. They always require the intervention of a cistern of some considerable capacity placed high up; and in large establishments a separate meter would be required for every cistern. They may, in fact, be considered quite inadequate to the requirements of modern water supply.

Among high pressure meters a greater variety exists; they may be divided into two principal classes—those which give a positive registration of actual quantities of water, and those which register by inference from the flow or pressure of the water passing through them.

Amongst positive high pressure meters, various arrangements of piston and cylinder hold the first place. The principle of these meters is, to inclose in a hollow, carefully bored cylinder of known capacity, a piston free to move from end to end by the pressure of the incoming fluid, the piston being caused by this force to drive out the quantities of fluid already measured. This motion, and its degree of perfection, will depend mainly on the arrangement of the valves which regulate the inlet and outlet of the liquid.

In the simplest form, the piston, very carefully packed, is fitted with a long piston rod, protruding from a packing box at one end of the cylinder, and bearing one or two catches, which, just as the piston reaches the top or bottom of its stroke, come into contact with or strike against the ends of levers, causing the valves to shift; or the same is effected by a roller on the piston rod running up and down in a slot in a bar of metal, and striking each end in turn; the bar, on receiving the blow, throws over a weighted lever, which alters the valves; or, by some, a rack is used attached to the top of the piston rod; this gears with a pinion on a fixed shaft, two catches are fixed on each side of the pinion, and these alternately throw over a weighted lever from side to side; the weight in falling turns a four-way cock. This last is a device used by Mr. Kennedy, in his patent water meter, one of the first ever brought into use. It possessed the advantages over others of the same time, that it allowed a continuous stream of water to pass without serious loss of head, and registered very correctly. But the acknowledged defects of expense and great complexity, and also the continual attention required to keep it in working order, have caused its gradual fall into disuse, for it was found, as soon as the oil in the works, which are not in these meters in contact with the water, got thick, the tumbling weight refused to fall, and the water passed through the half open valve without registry; and fresh oiling was found necessary every few months.

Messrs. Chadwick and Frost, in their Manchester positive meter, cut a long flat strip off one side of the upper part of the piston rod; against this flattened portion a roller is pressed to the end of a bent lever, the square ends of the strip or slot drive the other end of the lever at right angles to the piston rod, causing it to actuate in that line of direction a valve, which allows the water to flow alternately through the connecting link to the back of two small circular discs; its pressure at once forces each forward in turn, carrying the main valve with it, thus forming a fluid pressure valve. This arrangement is found superior to Kennedy's meter, and in fact has gained the ascendency over all the cylinder meters we possess; but it is an expensive meter, and the number of wearing surfaces it contains prevent that durability which a high original expenditure ought to insure to customers. It will not either, without great additional outlay, stand exposure to heated water.

A French patentee specifies a long cylinder, containing two pistons joined by a rod, passing through a central division with bearings, on which the cylinder rocks, by the greater weight of fluid alternately in each end, the central bearing being hollow and arranged on the four-way cock principle, and opened and closed by the tilting of the cylinder.

A large number of meters have also been devised, with two or more cylinders as measuring vessels: these are fixed side by side, fitted with pistons, and their rods working a common shaft by means of cranks. By the revolution of this shaft, two eccentrics or cams are made to open and close the valves; these are sometimes placed between the cylinders, sometimes on the outside, and in one case, in a meter designed by Mr. Duncan, placed at considerable angle to the piston rod. When the cylinders are placed in the same line, end to end, as in the case in some meters, the rod connecting the two pistons by means of a long catch, is made to actuate bars placed parallel to the piston rod and outside the cylinders. These bars move secondary valves, the primary valves being placed at right angles across the further ends of the cylinders, and driven by water pressure regulated by the secondary valves, thus forming a similar, but more clumsy, fluid pressure valve to that used by Messrs. Chadwick and Frost. In some cases the cylinders are made so as to slide telescopically on one common cylinder open at each end, with a central water-tight division; but in this arrangement the valves are a great difficulty, and the accurate fitting of the cylinders is expensive.

When the cylinders are set at an angle to one another, it is generally, as in an invention of Mr. Jopling's, at right angles, and the piston rod of one is made by direct action to open and close the valves of the other, the pair being enclosed in a water-tight casing.

[To be concluded in our next.]

The Water Works of Philadelphia, Pa.

A copy of the annual report of the Water Department of Philadelphia has been forwarded to us by Mr. Frederick Graff, chief Engineer, from which we extract the following interesting information;

"The supply of water distributed during the past year has been much greater than any previous year. The average daily supply from all the works, for the whole year, has reached 37,149,385 gallons. The average supply for the month of July was 46,008,735 gallons per day—and the maximum supply of any one day was on July 20, 1870, when 54,655,509 gallons were delivered. This was equal to 81 gallons per day for each one of the population of the city per last census; but our citizens do not all get a supply from the works, many in the rural wards obtaining water from springs and wells. The water supplied on that day was equal to 92 and three tenth gallons for each of the population who actually receive water from the works, and 540 gallons for each of the water tenants now upon our books; of course, no one can believe that each man, woman, and child of the population supplied, consumed for their actual wants 92 and three-tenth gallons a day; therefore, the immense amount wasted must be evident.

"The increase in the water supply is in much greater ratio than the increase of population. This occurs, probably, on account of the multiplication of modern conveniences for using water; such as water closets, wash basins, stationary wash tubs, wash pavements, and the increased number of each now considered necessary or desirable in our dwellings; besides the more lavish discharge of waste water into drains and sewers than formerly—whereby it can be wasted without fear of detection.

"Whilst the supply of water delivered in our city is as copious as that of any other in the United States, the price charged for it is very much lower; a very trifling increase in some of our charges, for what may be considered as the "luxuries of water supply," and which would scarcely be felt as onerous, would enable us to make a marked increase in our revenue, and a corresponding decrease in direct taxation.

"Over 26 miles of distributing pipe have been laid, including mains of 30 and 36-inch diameter, making the aggregate amount of mains and pipes used in distributing the water 488½ miles, a greater amount, by nearly 150 miles, than any other city in the United States, and only exceeded in the world by the city of London.

A LARGE SUBMERGED WATER MAIN.

"It was decided to use the Belmont Reservor for the supply of the high wards on the east side of the river, particularly the 20th and 28th Wards; to do this, it became necessary to cross the river Schuylkill with the main, and it was decided to use a submerged pipe, designed and patented by John F. Ward, of Jersey City, N. J.; a contract was accordingly made with that gentleman, and the main has been successfully laid.

"It is 36 inches in diameter, has a movable joint of simple and peculiar construction which admits its being sunk length after length, from scows, by suitable skids and derricks.

"The inside of the bell of the pipe is turned smooth to a spherical form, the small end of the pipe having grooves in it to retain the lead; when two pipes are put together, a lead joint is cast and caulked in the ordinary way. The smoothness and form of the inside of the bell permit the requisite motion, the lead joint slipping upon that, whilst it is retained firmly by the grooves in the small end of the pipe.

"The total length of the pipe is 963 feet, and the deepest water 25 feet; at each side of the river, at the shore ends, a suitable channel was dredged to receive it."

Smedberg's "Synopsis."

The following additional subscribers to the above work are herewith acknowledged, making 344:

E. M. Breese, Ass't Engineer Cincinnati Gas Works

H. B. Slater, Treasurer Providence Gas Co., R. I. (1 additional copy.)

W. H. McClelland, Treas. Pittsburgh Gas Co., Pa.

S. Parrish, Hudson City, N. J.

Correspondence.

[Correspondents, in all cases, should sign their communications with their names and address in full—not necessarily for publication, but as a guarantee of good faith.—Eds.

[Written Expressly for this Journal.]

Peat as a Gas Producing Material.

Boston, May, 1871.

Messrs. Editors: Having gone over the ground pretty thoroughly, as relates to peat for gas and fuel purposes, and the process of manufacture, I am induced again to refer especially to the matter of gas.

The letters relating to *gas from peat*, have elicited numerous enquiries from gas men, showing that the subject is of importance in their estimation.

It is to be hoped that many will test the matter, each in their own way, and if those who do so will favor me with statements of their operations, with results and suggestions, I will endeavor to make such use of them as shall be promotive of the common good.

There is hardly a gas company in the country which cannot procure peat in some shape. Let each devote a little attention to it at as early a day as practicable. If manufactured peat is not to be had, a few dollars will suffice to employ some one to cut a little from some neighboring peat bog; then dry it in lumps just as it is cut out, or what is better, work it over with a hoe, temper it a little in some simple and inexpensive manner, then spread it on the ground three inches thick, mark it off into blocks with a pointed stick, and when dry gather it for use.

Without changing anything, add to the usual charge of coal say five per cent. of *peat* (see that it is *well dried*) and note the effect on volume, quality, etc.; on subsequent days try ten per cent., fifteen, and so on up to fifty and seventy-five per cent., when perhaps it will be found quite practicable to run an entire charge of *peat* alone: no damage done, something learned by observation, and *possibly* developments of practical importance and value.

Peats differ in their characteristics quite as much as coals, and the results obtained, should there be anything like a general response to this suggestion, would from this cause, doubtless vary materially as relates to volume, illuminating power, etc.

In this connection I beg to refer again to letters which appeared in your issues of Dec. 16, Jan. 16 and Feb. 2, as affording such data upon this subject as has come to my notice; and the following extracts from a communication with which I am favored from one of experience in the science and practice of gas manufacturing, who has also during three successive years had large experience in the use of peat, I am sure will be of practical interest to many who are considering the subject. He writes:

"In the economical use of peat for manufacturing gas, my observations and reading lead me to class all the published modes under three heads.

"First, dry peat may be substituted for resinous wood. Using iron retorts the heat is to be low, as for wood, and the charge worked in three to four hours. The experience of the Philadelphia Gas Co. on wood, is a fair expression of results obtained on average peat. Exceptionally good peat, machine prepared, will give gas of higher candle standard than that afforded by any kind of wood.

"In all cases it is best to heat the retorts with other fuel than the peat coke, as this, like charcoal, is more valuable for applications where charcoal is consumed. For such use it should be cooled in close vessels without watering.

"Second: Machine prepared peat mixed with small coal in equal volumes, affords excellent gas and a firm coke, which may be used as retort fuel as usual with coal coke. Even sulphuretted coal may be used for addition to the peat, as the compound gas is easily purified. But doubtless the thoroughly uniform mixture of small coal (siftings and mine refuse) with peat in the machine, would give a material for gas of value superior to either coal alone or peat alone, and a desirable coke.

"The proportions of peat and coal in such mixture must of course be varied somewhat to produce the standard gas, from such peat and such coal as the particular market or region affords.

"Third: As the basis of "Water Gas" machine made peat will find its most economical consumption. The usual adaptations, with either clay or iron retorts for water gas, being adopted.

"The new feature is the removal of all the uncertainty hitherto met with in producing this gas, in *consequence of the high tempreature required in retorts containing coke from coal.*

"The steam, superheated in the exit flues of the furnace, enters the retorts containing the ignited peat, and dissolves all but the ashes of the peat, and the carbonized gas goes forward free from sulphur compounds, containing carbonic acid for purification.

"If carbonic acid is to be wholly avoided, it is only necessary that the gas passing through the main should enter and pass through a large retort charged with peat and heated, a second one for alternating being ready when the first has its charge consumed, and all the carbonic acid and vapors will be destroyed to form carbonic oxide.

"If the peat happens to be of a kind affording in this way a gas below standard, then at the scrubber a portion of light oil from petroleum may be added and diffused, or cannel coal may be *slowly* distilled so as to afford oily illuminants to the gas on its way to the scrubber.

"This mode of utilizing peat is on the basis of that adopted near Berlin, Prussia, where brown coal is used to produce gas of extremely low cost; but peat is far better than any brown coal and enables us to overcome all the uncertainties in the manufacture of water gas, and make what has been a doubtful business, a certain and very productive manufacture.

"When peat alone is used for gas the plans adopted have involved the sale of the peat charcoal as a profitable product.

"When the mixture of peat and coal is used, the coke produced will in part be used as fuel and in part sold as coke."

These two matters incidental to the subject, to which my correspondent alludes—peat charcoal or coke, and the mixed fuel of peat and coal dust—are deserving of more than passing notice, and I will therefore make them the subject of my next letter.

Very Respectfully,

T. H. Leavitt.

A Testimonial in Favor of the "Gibson Improvement."

Fitchburgh Gas Company,

Fitchburg, Mass, May 13th., 1871.

Messrs. Editors: This company has had the Gibson Improvement in use now something over one year, and during that time the valves have worked perfectly. They have kept themselves lubricated, and there has been no leakage or trouble of any kind from their use; and I do not hesitate to say, as the result of my experience, that I consider the improvement as applied to gas works, thereby dispensing with dip-pipes, both practical and safe, and they do save in a great measure the deposit of hard carbon (even from the use of the most sulphurous coals such as the Caledonia), the result of which is, greater illuminating power, a large increase of production, and less strain upon the retorts. I use clay retorts and no exhauster.

Having used the same kind of coal the previous year, with dip-pipes with the same age of retorts, I know whereof I speak.

Respectfully,

H. F. Coggshall,

Pres. and Sup't of Fitchburg Gas Co.

Tests for Impurities in Gas.

We glean the following easy tests for impurities in illuminating gas from Harris's *Gas Superintendent's Companion*:

test for sulphuretted hydrogen.

Dissolve a small quantity of acetate of lead, commonly called sugar of lead, in distilled or rain water, until the mixture is about the consistency of cream; dip into it a piece of writing paper, which hold a minute or two over a jet of gas (unlighted); if the paper be not discolored, the gas may be considered pure; but if a brown stain be imparted to it, the lime in the purifiers should be renewed. This test will detect the presence of sulphuretted hydrogen in gas if it contain one part in 20,000.

Note.—As this preparation of lead is an active poison, it should be used with caution and labeled.

A solution of nitrate of silver and distilled water is a more delicate test than the above.

for ammonia.

Apply either litmus paper or yellow tumeric paper reddened by vinegar, or any other weak acid, to a jet of gas, as above; if the blue color or the litmus paper return, or the color of the tumeric paper deepen to a brown, the gas contains a proportionate amount of ammonia.

carbonic acid

may be detected by adding to water impregnated with the gas a few drops of sulphuric acid, when minute air bubbles of carbonic acid gas will be rapidly disengaged.

Another test is to pass the gas through a solution of pure barytes in the blue tincture of litmus, when, if carbonic acid be present, carbonate of barytes will be precipitated.

atmospheric air.

The presence of atmospheric air in gas can be readily detected by collecting a portion of the gas over mercury, and then passing up, first a few drops of caustic potassa, and afterwards a drop or two of a solution of pyrogallic acid. If the liquid assume a blood red hue, oxygen, indicating the presence of atmospheric air, is mixed with the gas.—*Muspratt.*

bisulphide of carbon.

By forcing, by means of an ordinary blow-pipe, the flame of coal gas, for about a minute, on to distilled water containing a little acid chloride of barium, sulphate of baryta is formed, and the presence of sulphur in the gas thus proved.

Coal Resources and Coal-Mining.

Mining of anthracite coal was begun in this country in 1820. The anthracite coal region embraces 470 square miles of land. In 1820, when the mining operations were confined to the single county of Schuylkill, Penn., there was a population of 20,000 in the suburbs of this coal region, and 865 tuns of anthracite coal were mined. Since that time the production has been, at the beginning of each decade, as follows:

Years.	Population.	Tuns Mined.
1830	45,000	174,734
1840	70,000	864,384
1850	130,000	3,358,899
1860	220,000	8,412,946
1870	350,000	15,723'030

The amount of anthracite coal yet in the earth is as follows, the area and thickness of the veins being accurately known:

	Miles. Square	Yards. Depth of Coal.	Tons.
Central coal-fields	126	15	5,854,961,000
Southern coal-fields	146	25	11,308,842,000
Northern coal-fields	198	15	9,179,872,000
Total	470	...	26,343,675,000
Deduct one-half waste in mining			13,171,837,500

Leaving of marketable coal 13,171,837,500 tuns, or a deposit equal to annual supply of 20,000,000 tuns for six hundred years.

Statistics of bituminous coal operations show that within a circle of one hundred miles, of which Pittsburgh, in the western extremity, is the center, there is enough bituminous coal in the earth to pay off the national debts of all the governments of the world many times over. And it has been estimated from geological surveys, that this coal would pay our national debt fifty-four times if its stupendous value could be realized at once.

Far down in the mines (in some instances as much as 1,500 feet below the level of the rivers), there is in the small anthracite region more than four hundred miles of railroad, not included in the aggregate of the railways in the State of Pennsylvania. These subterranean railways would, if formed into one continuous line, reach from Boston to Washington, or they would form a double track from Philadelphia to New York and back again.—*Syracuse Journal.*

Proposed Revision of the English Patent Laws.—It appears at last, that there is hope that the English patent laws are about to undergo wholesome revision. Mr. Hinde Palmer, Queen's counsel, who is reported to be a friend of the working man, has taken the business in hand, and proposes to bring in a new bill, based upon sounder principles. It is expected that Mr. Macfie and Mr. Samuelsok, who go for the get-all-for-nothing principle, will do all they can to defeat Mr. Palmer's reforms. The patent system in England ought to be amended, so as to recognize the primary right of the inventor to take the patent, and thus put a stop to the legal stealing of other men's ideas.—*Scientific American.*

TO INVENTORS AND PATENTEES.

This Journal, circulating, as it does, throughout the United States, Canadas, and portions of Europe, is a superior medium for advertising.

We also take out Patents in the United States and Europe, obtain Extensions, and make a *Specialty* of difficult and abandoned cases.

A. M. CALLENDER & CO.,
No. 42 Pine street, New York.

RECENT AMERICAN PATENTS.

Pertaining to the Specialties of this Journal, for the two weeks ending May 6th., 1871.

113,725.—Steam Pump.—Wm. Baxter, Jr., Newark, N. J.
113,810.—Steam Engine Valve.—Nathan Page Stevens, Hopkinton, N. H.
113,818.—Steam Engine.—Sam. D. Tilman, New York city.
113,823.—Water Wheel.—John S. Warren, Fishkill-on-the Hudson, N. Y.
113,843.—Low Water Indicator.—Wm. A. Bradford, Cincinnati, Ohio.
113,891.—Pipe for Water, Gas, etc.—A. K. Johnston, Brooklyn, N. Y.
113,897.—Steam Pump.—Lucien J. Knowles, Worcester, Mass.
113,905.—Combining Carbonaceous Matter for the Manufacture of Gas.—Geo. McKenzie, Glasgow, Scotland.
113,906.—Revolving Gas Burner.—Frederick McLewee, New York city.
113,942.—Gas Condenser.—I. N. Stanley, Brooklyn, N. Y.
113,956.—Steam Engine Valve.—S. H. Whitmore, Decatur, Ill.
113,978.—Vaporizing Hydrocarbons.—John Butler New York city.
113,989.—Steam Engine.—Thos. Edwards, Birmingham, Eng.
114,024.—Steam Boiler.—Thos. F. Morrison, Bryan, O.
114,052.—Steam Boilers.—George Sewell, Brooklyn, N. Y. Antedated April 22d, 1871.
114,125.—Steam Engine.—D. R. Fraser, Chicago, Ill.
114,154.—Water Wheel.—J. L. Kurtz, York, Pa.
114,176.—Water Elevator.—A. A. and P. McPheeters, Arbor Hill, Va.
114,202.—Feed Water Steam Boilers.—Thos. Roberts, Baltimore, Md.
114,206.—Gas Regulator.—H. Shutte, Kansas City, Mo.
114,211.—Water Wheel.—E. L. Small, Urbana, Ohio.

FOREIGN PATENTS.

Applications made by Americans for British Patents for the week ending April 5th, 1871, reported for AMERICAN GAS-LIGHT JOURNAL by our London Agents.

838.—Pumping Engines.—A. S. Cameron, New York city.
857.—Illuminating Gas.—D. Davison, New York city.
907.—Pyrometers.—R. Spencer, N. Y. city.

PRICES OF FOREIGN AND DOMESTIC GAS COALS.

[Reported Expressly for this Journal.]
April 17, 1871.
DELIVERED IN NEW YORK.

English Cannel.			
Ince Hall	$11 25	@	11 75
Kirkless Hall	10 75	@	11 25
English Caking Coals.			
Newcastle Gas	$7 50	@	7 75
Liverpool caking	7 25	@	7 50
British Province Coals.			
International			6 00
Little Glace Bay			6 00
Pennsylvania Coals.			
Penn Gas Coal	$7 00	@	7 15
Westmoreland	7 00	@	7 15
Shafton	7 00	@	7 15
Youghiogheny	7 25	@	7 50
West Virginia Coals.			
Murphy Run	$6 75	@	7 00
Despard	6 75	@	7 00
West Fairmont			7 25
Fairmont	6 75	@	7 00
American Gas Coal	6 75	@	7 00
Newburgh Orrel	6 75	@	7 00
Pinnickinick	6 75	@	7 00
Cloverhill of Virginia	5 25	@	6 00
McKenzie Compound Mixture			8 50
American Cannel Coals.			
Peytona of West Virginia			$13 00
Darlington of Pennsylvania			— —
Asphalts.			
Albertite of New Brunswick	$16 00	@	17 00
Ritchie Mineral of West Virginia	— —	@	35 00
Trinidad Bitumen	— —	@	14 00

FOR SALE.

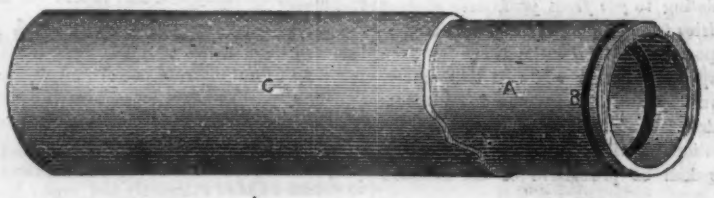
A VALUABLE **GAS COAL PROPERTY,** IN CLOSE proximity to the Despard Mines, near Clarksburg, in West Virginia. It contains 1000 acres, with a seven foot vein underlying the whole property; surface heavily wooded; the mines opened, and all the necessary machinery on the premises for immediate operations. It binds both sides of the Baltimore and Ohio Railroad, and possesses advantages for economical shipment; superior to any Coal Mine in the State. The coal is of superior quality, yielding a high test, as shown by the Manhattan and other gas companies. Good frame buildings on the premises for hands, etc. Will be sold low for cash, or exchanged for city or country property. Apply to J. G. SALVA, 58 Broadway, Room 25, or at the office of this Journal. 242-6t

NORTHWESTERN
GAS AND WATER PIPE COMPANY.

WORKS AT BAY CITY, MICHIGAN.

CHICAGO OFFICE, 41 REYNOLDS BLOCK.

SECTION OF GAS PIPE.



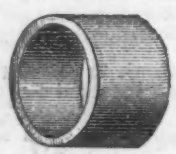


FIG. 2.

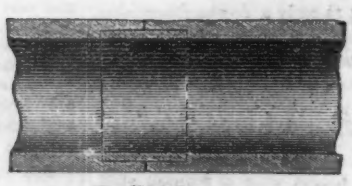


FIG. 3.

A—Cylinder of Wood. B—Band of Iron. C—Coating of Hydraulic or Asphaltum Cement.

FIG. 2.—Thimble for Connection. FIG. 3.—Horizontal Section and Connection.

Above is a cut of the

"WYCKOFF PATENT IMPERISHABLE GAS PIPE,"

manufactured by the NORTHWESTERN GAS AND WATER PIPE COMPANY.

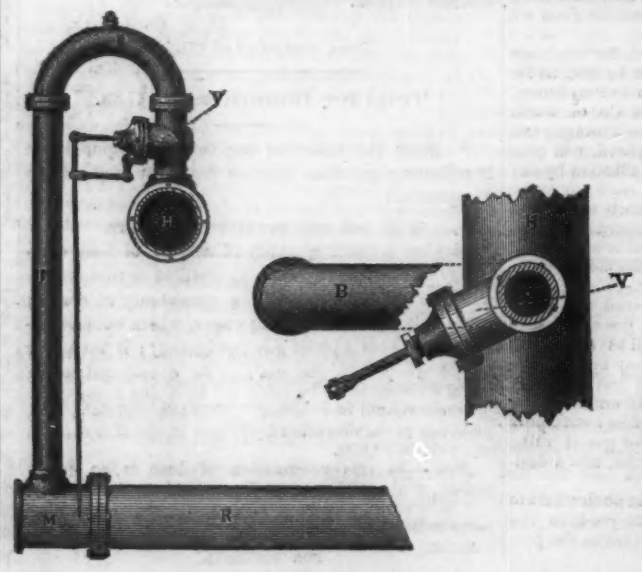
This Pipe is made of White Pine, one inch to twelve inches bore, in sections eight feet long, rounded in a lathe, coated inside and out with Asphaltum, connected with a tenor, or socket, and a thimble joint, perfectly air and water tight, being driven together with cement furnished by the Company. When laid its cost is about one half that of Iron Pipe, and is UNQUESTIONABLY the best Gas conducting Main in use.

☞ Send for Descriptive Pamphlet and Price List. 242-1y

The American Coal Gas-Light Improvement Co.

ARE THE SOLE OWNERS OF THE

GIBSON IMPROVEMENT



In the manufacture of Coal Gas by means of which Dip-Pipes are dispensed with, the deposit of Carbon in the Retorts prevented, and a very large saving is effected.

Licenses for its use will be granted; also the parts necessary will be supplied to order, on application at their office,

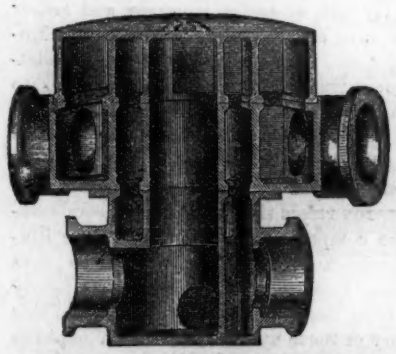
No. 79 Water street, Boston, or
No. 42 Pine street, Room 18, New York.

R Retort.
M Mouth-piece.
P Stand-pipe.
B Bridge-pipe.
H Hydraulic main.
V Valve-substitute for Dip-pipe.

SOUTHWARK FOUNDRY,

WASHINGTON AVENUE,

PHILADELPHIA.



IMPROVED DRY CENTRE VALVE.

Henry G. Morris,

Established 1836.

SUCCESSOR TO

MERRICK & SONS.

Gas Holders, Bench Castings, Condensers, Washers, Scrubbers, Purifiers, Dry Centre Valves, Exhausters, Purifier Trays of Wood or Iron, Iron Roof Frames, and Gas Machinery of all kinds of the most approved character.

WILLIAM FARMER,

ARCHITECT AND GENERAL GAS ENGINEER,

111 BROADWAY, TRINITY BUILDING, Room 91, New York.

WILLIAM FARMER may be consulted upon all matters connected with the construction of GAS WORKS and other buildings. Will furnish General and Detail Drawings, Specifications and Estimates for Gas Works of any capacity, Retort Settings, Condensers, Washers, Exhausters, Purifiers, Holders, Coal Hoisting Apparatus, Iron Roofs, and every description of Machinery required in the Manufacturing of Gas.

PATENTEE OF THE FOLLOWING INVENTIONS:

Exhausters for Gas and Foul Lime Ventilation,
Dumping Barrows for Coal, Coke and Lime,
Blowers for Forgers,
Pumps for Water, &c., &c.

REFERENCES:

CHAS. ROOME, President Manhattan Gas-Light Company, N. Y.
SAMUEL DOWN, President American Meter Company, N. Y.
C. VANDERVOORT SMITH, Engineer Manhattan Gas-Light Company, N. Y.
CHARLES MOWTON, Engineer New York Gas-Light Company, N. Y.
SAMUEL P. PARHAM, Engineer Mutual Gas-Light Company, N. Y.
Prof. HENRY WURTZ, Editor Chemical Department GAS-LIGHT JOURNAL.
HENRY J. DAVISON, Engineer, 77 Liberty Street, N. Y.
HERRING & FLOYD, Oregon Iron Foundry, 738 Greenwich Street, N. Y.
FREDERICK SABBATON, Engineer Troy Gas-Light Company, Troy, N. Y.
Col. WHITE, Engineer People's Gas-Light Company, Williamsburgh, N. Y.
GEORGE W. PARSONS, Sup't and Eng'r, Rochester Gas-Light Co., Rochester, N. Y.
GEORGE W. EDGE, Engineer, Jersey City Gas-Light Co., Jersey City, N. J.
J. H. GAUTIER & Co., Fire Brick Works, Jersey City, N. J.
Professor SILLIMAN, New Haven, Conn.
JOHN HARRISON, Engineer People's Gas-Light Company, Baltimore, Md.
CHARLES FABEN, Superintendent and Engineer Toledo Gas-Light Co., Toledo, O.
PETER F. BURTIS, Supt. and Engineer, Chicago Gas-Light Co., Chicago, Ill.
JAMES R. SMEDBERG, Consulting Engineer, San Francisco Gas-Light Co., Cal.

MATERIAL FOR ICE HOUSES.—It is said that one of the best materials for ice houses is peat; but the genuine moss peat must be employed, and it ought to be cut in pieces fourteen inches long and five to six inches wide and thick. When it is thoroughly dried, it proves to be a poor conductor of heat; and when laid up around ice houses above the ground, is preferred by many persons to sawdust, tan bark, and the like. Peat has also been employed in Europe for building dams, and as protections to coffer dams, in laying subaqueous foundations.

EXPLOSION OF A GAS MAIN.—On Sunday, April 30, the main gas pipe leading from the Citizens' Company's Works sprung a leak in the sewer on Fourth avenue, between Eighteenth and Nineteenth streets, Gowanus, and exploded. The windows of several houses were broken, and the pavement of the avenue was heaved up in two places.

TREATING GAS.—We notice among recent English patents, an invention by W. Cleveland, consisting essentially in the employment of a stream or streams of steam, or of the vapor of gas liquor, or of other condensable vapor at pressure, for the purpose of exhausting, orfcing, and purifying coal, cannel, and other gas, and as a result cleansing the apparatus used in the manufacture of gas.

A TUNNEL UNDER BOSTON BAY.—A tunnel is projected to connect East Boston with Boston. The expense is estimated at $2,000,000, while the ferries, which are free, now cost $100,000 a year. The plans have been made with two tubes, each with an inside diameter of twenty-one feet, and to accommodate horse-cars, teams and pedestrians.

THE

AMERICAN GAS-LIGHT JOURNAL

AND

CHEMICAL REPERTORY.

PUBLISHED ON THE 2D AND 16TH OF EACH MONTH,

At No. 42 Pine Street, New York.

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Germany—B. WESTERMAN & Co., of New York.
Great Britain—TRUBNER & Co., 60 Paternoster Row, London.
France—LE JOURNAL DE L'ECLAIRAGE AU GAZ, 25 Boulevard Poissonniere.
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☞ All communications to be addressed to "THE EDITORS, No. 42 Pine Street, Room 18, New York.

CONSULTING CHEMIST, GEOLOGIST AND GENERAL SCIENTIST—
PROFESSOR HENRY WURTZ.

[NOTE BY PROFESSOR WURTZ.—Contributions and items for which I am, as a Scientist, individually responsible, will have attached my full name or initials.—H. W.]

TUESDAY, MAY 16, 1871.

WISHING TO MAKE THIS JOURNAL an organ of intelligent discussion to those of our readers who may wish to gain or give information on the subject to which its columns are devoted, the publishers solicit letters from all among them who make the study of these subjects a pleasure, or a profession.

Subscribers would confer a favor upon us by remitting *CHECKS*, or *POST OFFICE MONEY ORDERS*, as we are frequent losers where money is enclosed in letters.

☞ NEWS AGENCY.—The American News Company, 119 and 121 Nassau street, New York agents for this Journal. News dealers will please send orders to them.

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CONTENTS.

☞ An asterisk (*) denotes an illustrated article.

*Triangular Trussed Wrought Iron Tower for Gasholder Suspension Frame....145
Protecting Water Pipes....146
Chemical Repertory....
Report on Petroleum Naphtha Gas, etc....146
*Trumbore's Dip-Pipe....147
Natural Phenomenon in Cleveland—Discovery of Natural Gas....147
Water Meters....148
The Water Works of Philadelphia....148
Subscribers to Smedberg's Synopsis....148
CORRESPONDENCE—
Peat as a Gas-Producing Material....149
A Testimonial in Favor of the Gibson Improvement....149
Tests for Impurities in Gas....149
Coal Resources and Coal Mining....119
Recent American Patents....150
Prices of Gas Coals....150
EDITORIAL—
Naphtha Gas....152
The Lectures on Sound at the Stevens Institute....152
Photometry and Railroads....152
Answers to Correspondents....153

General Editorials.

NAPHTHA-GAS.

We have now, for several issues, continued the presentation of the laborious research of Mr. EDGERTON on this subject, and are not even yet done with it. Besides a few further figures obtained by analysis, we have received from this gentleman (since preparing for the press the matter presented in this present number) some valuable *photometric* results, arranged in tabular form with appropriate comments.

Before proceeding with some general remarks on this head, duty appears to call attention to one or two things, connected therewith only in an illustrative way. Under our "Correspondence" head, in issue of April 17th, there is a note signed "ENGINEER," in which is thrown out the general hint, without allusion, except by inference, to this special matter, that we from time to time more or less recommend the adoption of new methods, without mature consideration of divers essentialities, varying locally, as market values of coal, coke, residuary products, etc., etc. Such criticisms as this, especially when expressed in so courteous a way, are altogether acceptable and appropriate. It is doubtless true that there are many localities, in fact large districts of this and other countries where these considerations have large influence, though we cannot help thinking that by the showing of Mr. EDGERTON's investigation, the margin of advantage and economy, so long as these refuse naphthas or "benzines" remain at their present very low price, must almost always swallow these up. Our present object is not however to discuss these points, which must go over to a future occasion, but to refer to further hints that have been less publicly thrown out, that our own readiness to bring forward these innovations may not be wholly disinterested. The present writer therefore thinks it due to himself simply to state that *he* has no interest in this thing in any way, and that he does not even enjoy the personal acquaintance of the gentleman who have it in hand, and that he has never even met, or corresponded with any of them. It is true that he was at the first probably led to give the subject a little more notice by finding the name of an old and valued friend, Dr. LEONARD D. GALE, connected with the enterprise as the pioneer inventor; but correspondence has since shown that this gentleman has long since parted with all interest in the invention. It is hoped that this may suffice to stop this sort of cavil, in this particular instance at least, and that we may have the credit of being influenced in this case by conscientious conviction. We ask pardon for the many words sacrificed to this.

Revenir.—Mr. EDGERTON, in his private correspondence alludes, in a suggestive way, to the recent propositions of Dr. LETHEBY and others to apply even in the manufacture of coal-gas, modes of manipulation similar in principle to that of Dr. GALE, namely to first distill off *vaporous* products at comparatively low heats, and then gasify these at higher heats. These plans seem to have struck the minds of English gas men as having great novelty, to say the least.

Another interesting point referred to in one of his recent letters relates to the effect of too high a temperature in modifying the molecular changes, so as to lead to the elimination of carbon. He says:

Though I collected all the carbon I could, some passed through even the condensers as lamp black.

"The deposit of carbon is not at all in the nature of coal gas-carbon. It is mostly in the form of an impalpable black powder, and might, if collected, form a residuary of some account. I have never noticed it however, except when a retort was palpably overheated. The decomposition of near a gallon of benzine did not blacken the interior of a retort when run at low red. Mr. Rand taps into the stand pipe of each retort a cock, by turning which, and blowing upon a bit of white paper, a black stain indicates carbon, and more vapor is then let into the retort; an amber stain indicates undecomposed vapor, and if of proper shade, that the heat on retort and vapor passing are in equilibrium.

"There is a manifest advantage in being thus able to adjust the charge."

This is highly interesting, as illustrating the principle we set forth in our former editorial article on this subject, that the proper limit of temperature for this operation is narrow and rather low. We have an important note from Mr. EDGERTON also on "Permanency of the Gas," relating to conclusive tests of a gas made at the rate of 52 feet to the gallon of naphtha, which actually slightly increased in candle power (from a burner not adapted for so rich a gas) from the small condensation produced by ice and salt. Mr. EDGERTON refers this resistance to condensation to the comparatively *low density* of the illuminant hydrocarbons present, which he says ranges from 1.25 to 1.38, corresponding nearly with gas from Boghead cannel. It is also to this low density of these hydrocarbons from naphtha that must be attributed in great degree the success of the thing, as distinguished from repeated failures formerly with the heavier petroleums, simply because these lighter naphtha gases may be readily burned without smoke.—H. W.

THE LECTURES ON SOUND AT THE STEVENS INSTITUTE.

By the time we go to press, the first lecture of this course, by Dr. J. SOLIS-COHEN, of Philadelphia, will have been delivered. In our last we gave an account of the (prospective) substance of this first lecture; which we now follow up, according to promise, with that of the remaining three. We take the occasion to say that we have an authoritative account of the new STEVENS INSTITUTE OF TECHNOLOGY, its plans, arrangement, and internal economy, for which room will be made in our next.

Lecture II.—May 18th. is entitled "Musical Intervals and the Optical Demonstration of their Numeric Relations."

This lecture will treat of the physical processes and mathematical laws on which harmony depends, and the existence of these laws will be demonstrated optically by a series of very delicate experiments with the manometric flame apparatus of KŒNIG, the sound figures of LISSAJOUS, tuning forks, CHLADNI's plates; and various other experiments with tuning forks, stringed instruments and organ pipes, the whole comprising an analysis of musical sounds into their elements.

The production of harmony and the physical basis of *timbre* or quality of sound, will be demonstrated by a very interesting series of experiments with tuning forks, organ pipes, HELMHOLTZ double sirens, etc.

Lecture III.—May 25th. "Music in some of its Physiological and Psychological Relations."

This lecture will be of rather a philosophical cast. It will treat of the relations of sound to other forces, particularly its analogy with light, in which the curious physical relationship of the prismatic colors, will be found proportionate to the physical relation of the notes of the diatonic scale. Other analogies in reflection, refraction, etc., will be spoken of, as well as the points which militate against complete analogy and thus destroy this very pretty conception of recent observers.

The manner in which sound is in great proba-

bility converted into thought will be approached by a series of beautiful physical experiments, for the comprehension of which we shall have been prepared in the previous lectures; starting from the so-called sympathy of sound (which the lecturer prefers to call vibration by influence) and imitating the conveyance of sound to the nerves of hearing, whence consciousness of sound is transmitted to the brain and rendered into thought and resultant ideas.

This lecture will also treat of the power of music upon the human and brute mind, and its influence to do good and restrain evil; and it will be enlivened by the relation of a number of curious anecdotes.

Lecture IV.—June 1st. "Voice and Hearing."—The final lecture will apply the principles already studied to an investigation of the mechanism of these two important functions of our being. The mechanism of the human voice in speaking and singing will be illustrated by models and drawings, many of them taken from life, during direct observation with the laryngoscope. The comparative anatomy and physiology of the vocal organs and of the organs of hearing will be alluded to, and explanation given of the phenomena of ventriloquism, and the method by which the dumb may be taught to speak.

PHOTOMETRY AND RAILROADS.

One of the most remarkable examples of aids rendered by one art to another, apparently without the remotest connection therewith, is furnished by an account received from Russia of the use in rolling mills for iron rails of a form of photometer for determining the precise temperature at which the ends of the rails must be sawed off, to secure exact uniformity in length. The inventor of this plan is named PALANOW, being the director himself of a large iron works. Doubtless hereafter photometry will receive many more important applications in metallurgic and other arts in which intense temperatures are used. Our inventive readers will please turn the idea over in their minds.—H. W.

☞ We invite the special attention of Gas Companies and Superintendents to the suggestions contained in Mr. Leavitt's letter concerning Peat, on page 149, and trust they may meet with ready and earnest responses, as a very simple method of developing what is not unlikely to prove of great value and lasting importance to the gas-producing interests of the country.

Answers to Correspondents.

F. C. H. of Va.—Olefiant gas is sometimes termed heavy carburetted hydrogen in contradistinction to marsh gas, which is often spoken of as light carburetted hydrogen.

B. D. of Iowa.—We think you will not regret making the experiment of substituting clay retorts for a portion, at least, of the old iron ones you are about replacing by new retorts. If you make the trial let us hear the result, as we like to be advised of what progress is being made in all branches of gas lighting.

J. H. C. of Md.—The third edition of Peckston's Practical Treatise on Gas-Lighting was published in London in 1841. It was an excellent work for its day, but now would be considered rather behind the times. If you want the very best work on the subject, by all means obtain a copy of Clegg which you will find a most valuable fund of information and you will not regret having made the purchase.

E. P. S. of Ind.—The burner generally used is the five foot fish-tail, which is probably best adopted for ordinary purposes.

C. E. of Pr.—The fifth edition of Clegg is published. We will procure you a copy if you wish. The price is $10.

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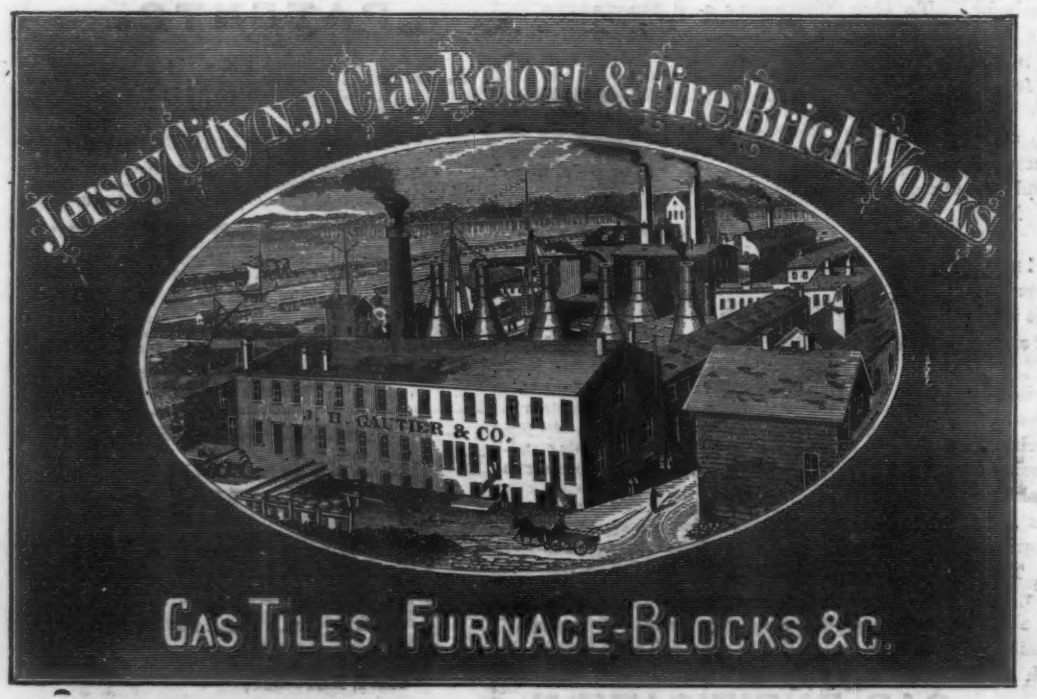

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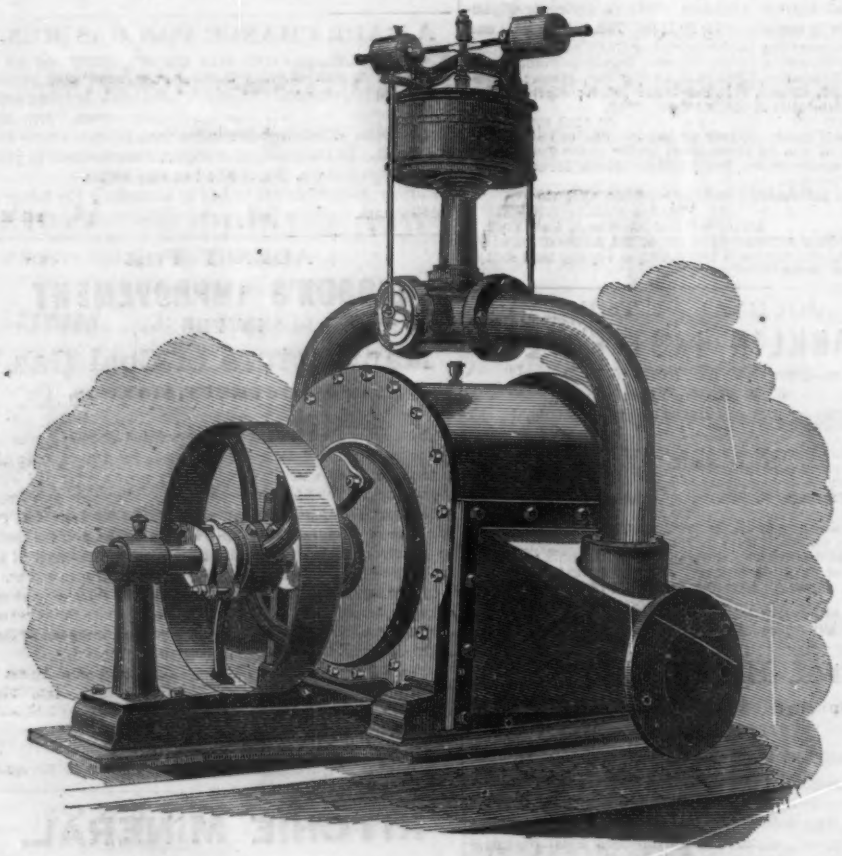

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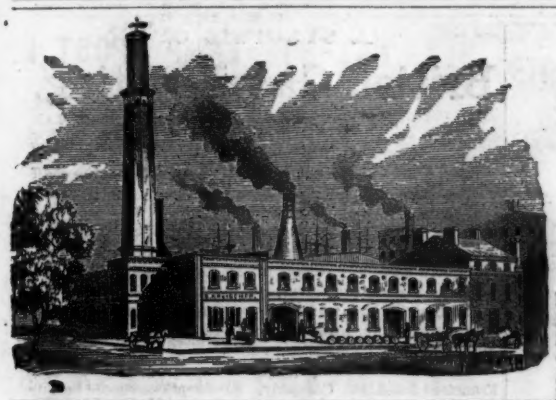

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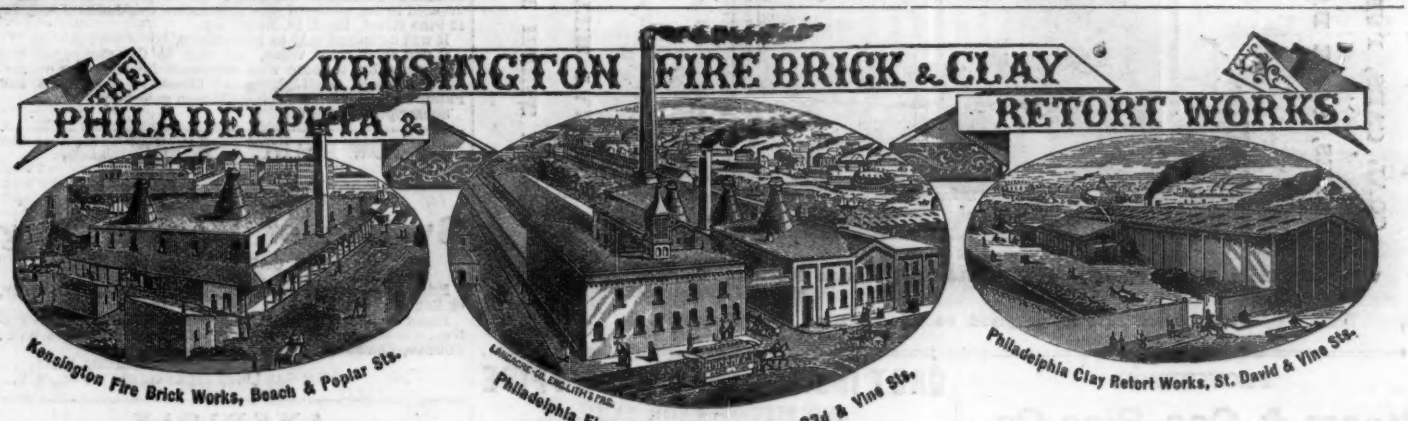

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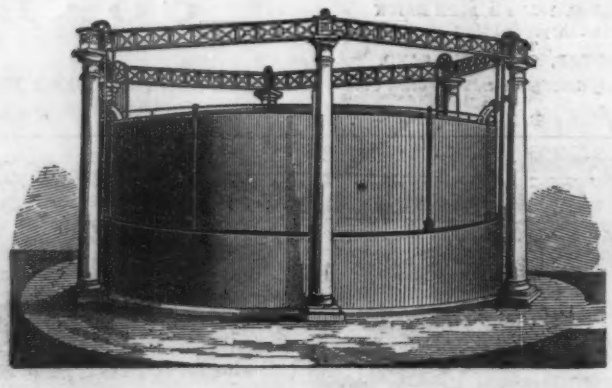

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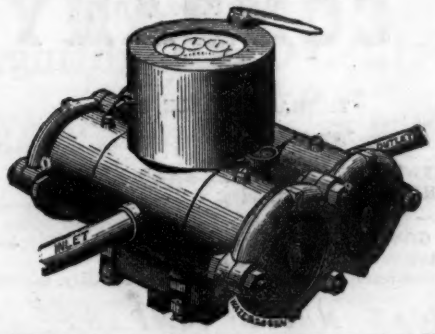

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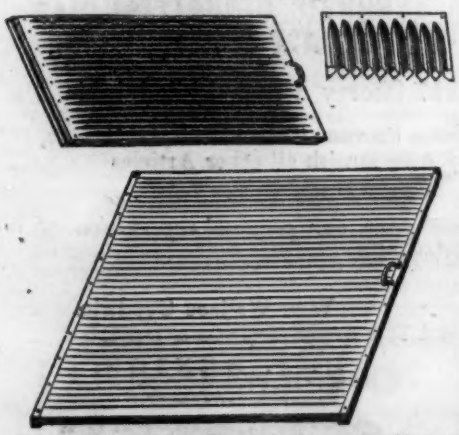

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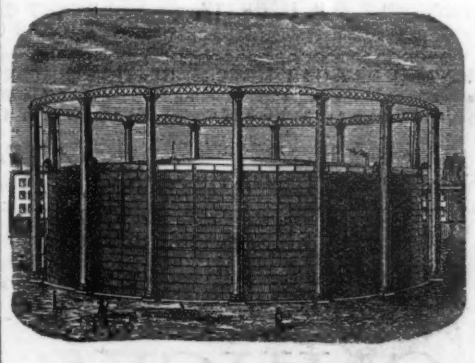

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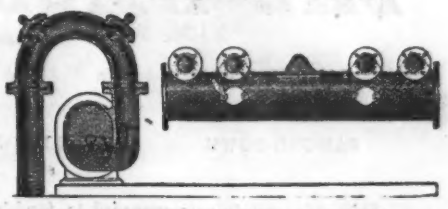

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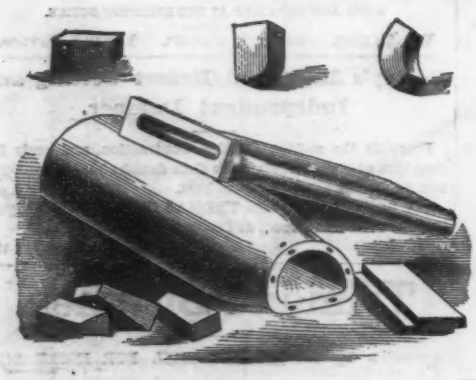

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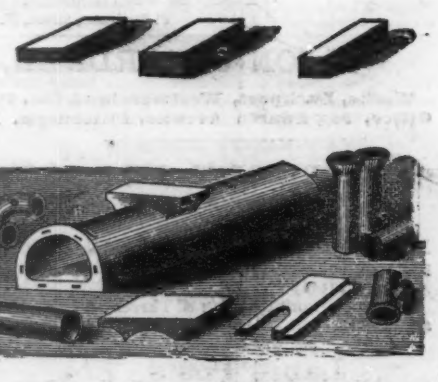

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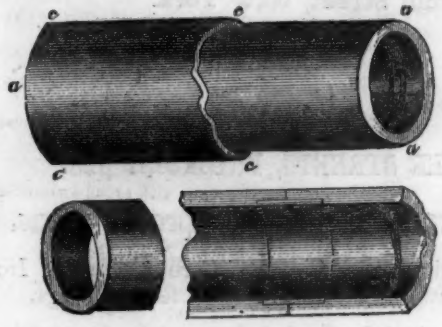

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Wyckoff's Patent Gas Pipe is less expensive than other kinds, more serviceable and more durable, being coated, inside and outside, with imperishable material, and impervious to air, gas or water, and warranted to give satisfaction. 219tf

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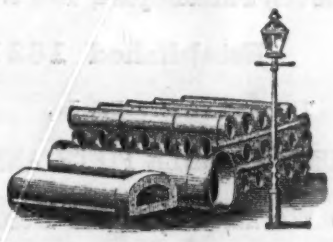

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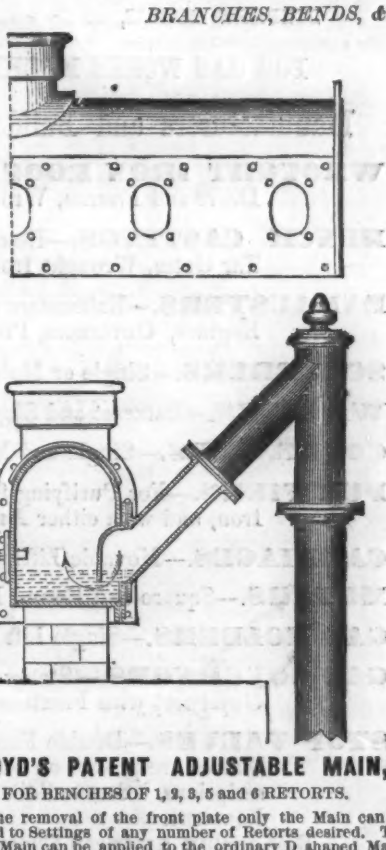

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By the removal of the front plate only the Main can be adopted to Settings of any number of Retorts desired. The Patent Main can be applied to the ordinary D shaped Main. It offers great facilities for cleaning, and is not liable to stoppage.

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Best quality American Charcoal Iron Boiler Tubes. Wrought Iron Tubes from one-eighth of an inch to ten inches diam., with all kinds of Fittings, Valves and Cocks, Gas and Steam Fitters' Tools, and all articles connected with the manufacture of Gas, Steam or Water.

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Mr. P. MUNZINGER, Gas Engineer, has been connected with our Establishment as Engineer and Designer, and in charge of the Gas Works Department for the past fifteen years.

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